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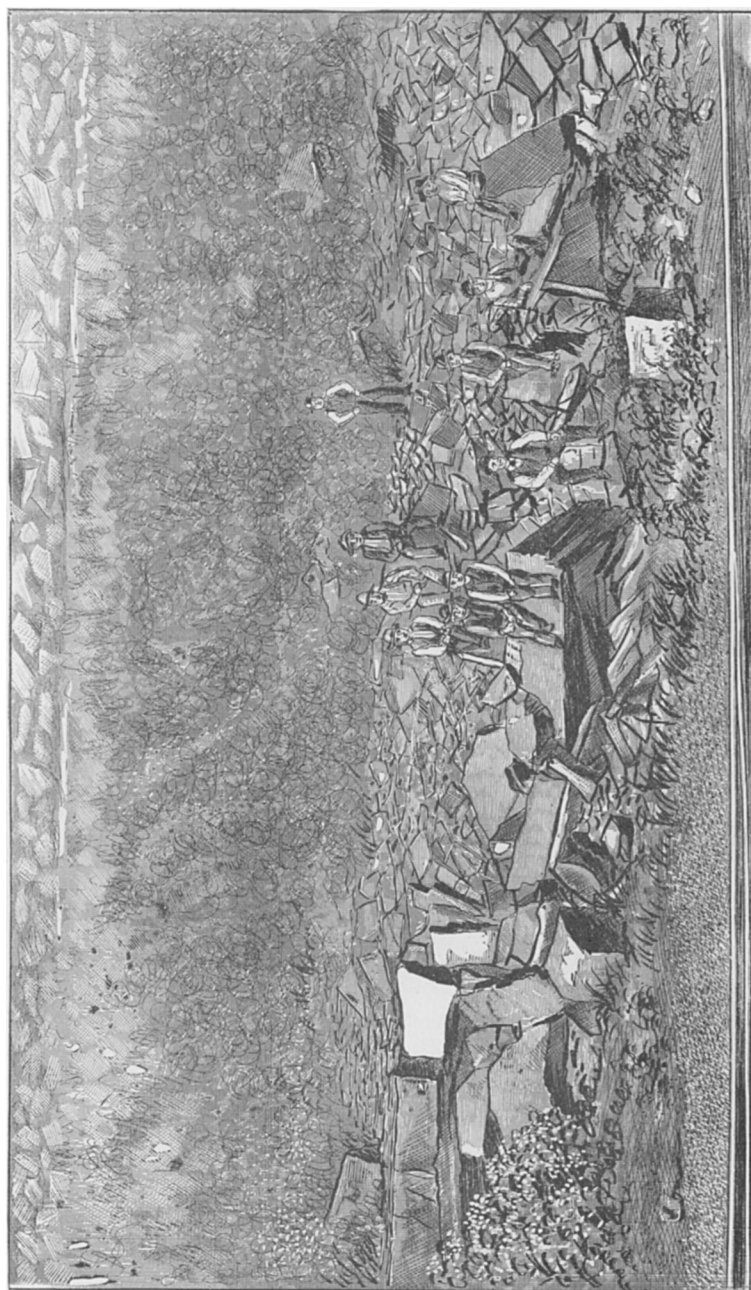
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Ledge of Triassic slate and sandstone at Weehawken, N. J., yielding fish remains.

FISH REMAINS AND TRACKS IN THE TRIASSIC
ROCKS AT WEEHAWKEN, N. J.

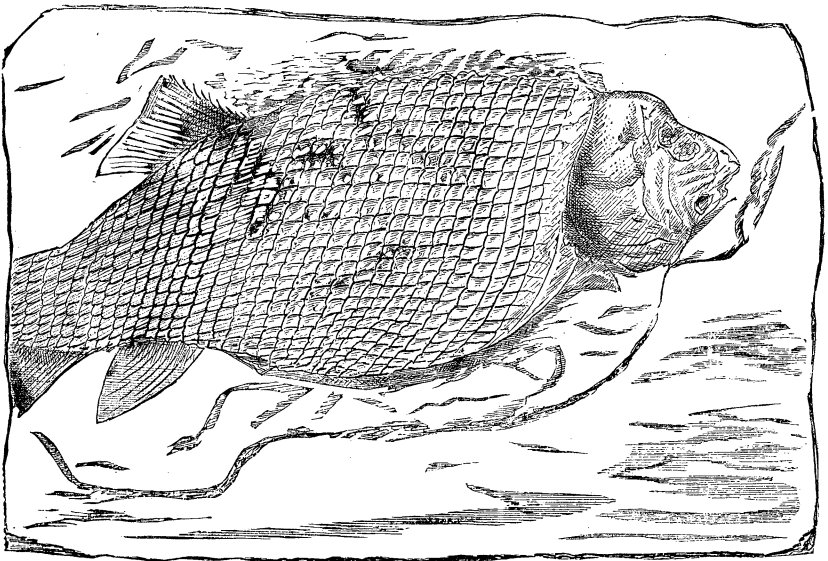
BY L. P. GRATACAP.

THE indurated and fissile shales that crop out beneath the superimposed masses of trap rock along the western bank of the Hudson river at Weehawken, Gottenburg and neighboring localities, have been frequently explored for fish remains. Their unequivocal position as Triassic slates, and the interesting developments made by I. C. Russel at Boonton, N. J., some years ago, in beds of an identical character, stimulated collectors to hunt here for similar fossils. As far as I know there is no published account of any success met with in the search, or indeed an account of any kind. *Estheria* in compressed and almost obliterated patches have been taken out, but the fish beds kept discouragingly out of sight. Mr. F. Braun, of this city, has recently revealed a large number of fish remains in the slates referred to, and has most successfully extracted specimens of considerable beauty. These specimens comprise almost whole fishes and numerous instructive fragments, while a few plant remains, tracks and ripple-marked blocks from the underlying sandstone have given to his discovery a more comprehensive interest.

In general the locality established by Mr. Braun is about 800 feet south of the mouth of the tunnel of the N. Y., W. S. and Buffalo Railroad, which pierces the trap ridge known as Palisade mountain, a long exposure of basalt limited by Professor Cook as follows: "It may be said to start near the Highlands west of Haverstraw, in Rockland county. The range is continuous to Bergen point. It reappears south of the Kill von Kull on Staten island, and finally disappears near the Fish Kills. Its total length from Ladentown, N. Y., to the Staten Island sound, is fifty-three miles."

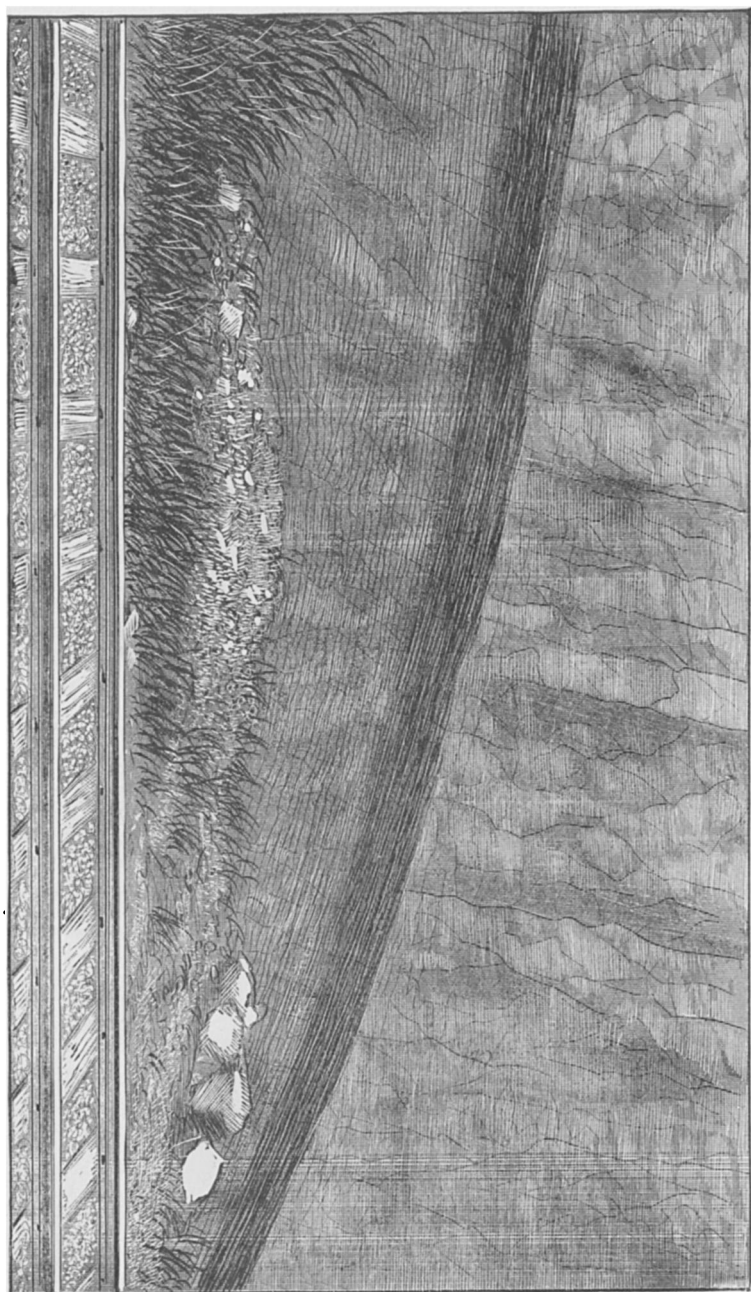
Mr. Braun commenced his quarrying in a bed of slates directly underlying the trap rock which rises in perpendicular walls far above it, and found his fish and plant remains restricted to a narrow layer of from three to four inches in thickness, and towards the base of the entire slate bed. An examination of the ledge, of which this bed formed a member, showed a succession of slate,

sandstone, slate and trap. At the bottom, forming a low shelf whose base was buried in the alluvium, was a slate group formed of closely compacted laminæ of slate in conformable contact with a bed of sandstone, which at the line of union with the slate was granular and siliceous, becoming compact and feldspathic on its upper side, where it becomes almost fused with a second bed of slate, the fossil layer, above which rose the trap cliff. The exposure of the first slate bed had a thickness of five to six feet, the thickness of the sandstone was four feet, and that of the fossil



Palæoniscus latus Redfd., Weehawken, N. J.

group, as far as could be determined, eight feet, when the base of the trap was reached. The average dip of the series was 17° N. W., and the strike N. N. E. Two photographs were taken, one of the ledge itself (Plate XII), formed of the three beds, and a second at the mouth of the great tunnel, some 800 feet north of this point, where the fossil layer of slate rock with its lines of bedding can be seen conspicuously meeting the trap, fissured by crevices of vertical cleavage (Plate XIII). The first photograph was rather unfortunately invaded by a local group of sitters bearing no sensible relation to its particular object. The standing



Contact line between inclined slate bed bearing fish remains, etc., and trap, at Weehawken, N. J.

figure at the top marks the fossil layer of slate and the location of Mr. Braun's find.

The fossil remains taken from the slate comprise casts and impressions of plant-roots or root-like fragments, the lobate divisions of an aquatic plant, an enigmatical nut displaying its coaly and black nucleus, and numerous fishes in various stages of preservation, and in positions that seem to throw a light upon the local circumstances of their entombment. Mud cracks reticulate the slate slabs in ramifying lines, the silent witnesses to processes along the shores of an ancient Triassic estuary, identical with those that produce to-day the same markings upon a sun-baked bar.

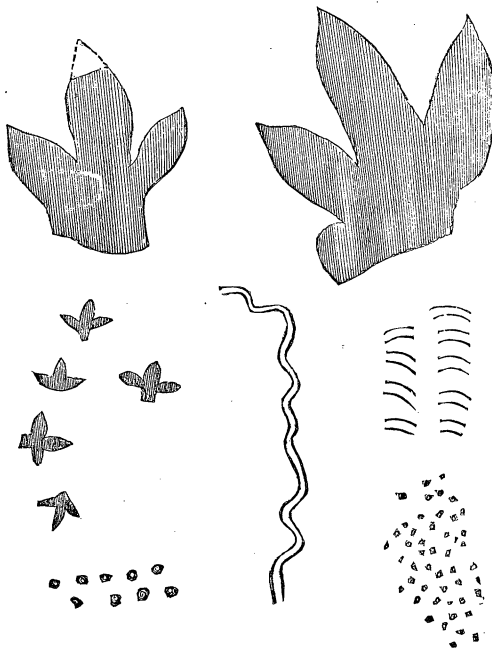
One of the best examples of the fishes in Mr. Braun's collection, now in my possession, is shown in the foregoing sketch.

I think all the fish remains I have are identical with this one as to genus and species, and it appears identical with *Palæoniscus latus* Redfd. On a specimen, other than the one figured, the dorsal fin shows the coarse raylets attached to the anterior spine, and its position, although quite far back, does not correspond to the insertion given for *Catopterus*. The fishes are found laterally compressed and usually straight, but in some instances the creature has become doubled and turned over on itself as if entrapped while wriggling in its contortions to escape again to the water, which receding left it exposed upon a muddy flat.

Many have become macerated, and the surrounding shale is strewn with their scattered scales, whose disconnected marks gradually become closer in one direction, leading the eye to a formless cluster of scales and head-parts. Most of the specimens suggest that the fishes perished in numbers and were buried beneath later films of detritus as they lay motionless upon their sides. The locality so lately discovered may reveal more of interest both as regards these fish in their zoölogical status, the character of their habitat and the manner of their death. I have found in these slates lenticular masses of a pulverulent and highly carbonaceous material which yielded seven per cent of combustible matter, and would doubtless have reacted for phosphoric acid. They seem connected with the organic occupants of the rocks, and may have arisen through their decomposition.

In the sandstone below this slate Mr. Braun has found impres-

sions, the most striking of which are shown in the wood-cut, suggesting tracks.



Tracks and markings on Triassic sandstone at Weehawken, N. J.

Ripple marks and rain fossæ on other slabs help vividly to recall a shore upon which these ancient waters of the Triassic basin washed, laving the forms of amphibious reptiles or pouring over crawling Crustacea, while showers beat upon the imprinted sands; and on shelving and shallow bars the ripples sculptured their counterparts in gentle furrows.

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RESEMBLANCES IN ARTS WIDELY SEPARATED.¹

BY OTIS T. MASON.

FROM the times of the earliest travelers down to the present day, we have narratives of the occurrence of the same inventions (implements), practices, modes of speech, institutions, theories, and religious creeds and cults in regions wide apart.

The older historians and ethnologists were wont to say that

¹ Read before the Washington Philosophical Society, Jan. 30, 1886.